

Elevator calculation acc. EN81-20/50

Elevator data

Nominal load	Q	kg	630	
Car weight	F	kg	750	(577 - 1754kg)
Counterweight	G	kg	1065	(50%)
Travelling speed	v	(V_3=)	m/s	1,60
Travel distance	H	m	45,0	
Suspension / (roping)	is			2 : 1
Machine at the top, above				
Shaft efficiency	etaS	%	82	
Number of pulleys	(ball bearing)		3	
Type of rope	WOLF PAWO F7			
Number of ropes	z		5	
Rope diameter	ds	mm	8	
Rope weight	s	kg	58	(0,258 kg/m)
Compensation rope weight	su	kg	116	
Car cable weight	HK	kg	22	
Rope span weight	R	kg	0	
Min. rope breaking load	B	N	40600	
Traction sheave diameter	Dtr	mm	320	
Sheave width		mm	110	(number of grooves

6)

Groove distance		mm	17,0	Standard
Angle of wrap minimum	min.	deg	180	
Undercutangle		deg	90	
Undercutwidth	b	mm	5,66	
Groove angle		deg	30	

Sheave profile: circular undercut groove

Traction, rope pressure, rope safety

Traction empty, on top, accelerating
 $1,6307 \leq 1,7866$
 Traction 150% nominal load, below, not moving
 $1,5333 \leq 1,7866$
 Rope pressure $k <$ permissible rope pressure
 $5,77 < 9,00 \text{ N/mm}^2$

Conditions according to EN81-1 or -20:
 Load 125% $1,4192 \leq 1,8119$ (2)
 Emergency stop $1,5213 \leq 1,5688$ (2)
 with deceleration $[m/s^2] 0,500$
 Blocked car $09,450 > 3,2830$ (4)

Real safety factor $>$ Minimum safety factor for ropes
 $27,25 > 12$
 Rope safety factor according to EN81-1 or -20:
 NEQUIV = 07,0 NEQUIVT = 05,0 NEQUIVP = 02,0
 Pulleys $\geq 320 \text{ mm}$, pulleys NPR = 0 NPS = 2
 Rope safety $\nu_{ue} = 27,3 > 16,4$ (minSF)

Rope certification EN81

Traction conditions are fulfilled.
Rope safety conditions are fulfilled.

ZAlift - 20170315 - Machine dimensioning ZA-145531

Mechanical drive data

Machine manufactured by Ziehl-Abegg
Machine type SM 200.20C Gearless synchronous
Machine version ZAtop *
Traction sheave mm 320 /110/17,0/6x8/U90
Load output torque Nm 321 (max. 396)
Real statical axle load kg 1349 (max. 2440)

Brake data

brake Mayr ROBA-twinstop 350, 2x410 Nm, EU-BD 845 (ABV845 + ESV845)
Dual circuit disk brake, DC supply necessary
(265 Nm, 0,64 m/s², 3 m, 13484 J, 164 W)
207 V brake, with hand release, microswitch

Machine load data in the installation

Typical motor operating power kW 4,4
Typ. operating current 18,5 A, Start. Current 35,1 A at acceleration 0,80 m/s²
Start. Current 33,0 A at acceleration 0.7 m/s²
Average power losses 0,95 kW = 3406,17 kJ/h
Output speed rpm 191
Load torque Nm 321,2 (eff. 219,0)
Inertia of installation kgm² 17,88
240 Starts per hour, 50 % required duty cycle at elevator operation
Max. static load pulleys 11589 N, pulley speed 1,60 m/s

Selected ZIEHL-ABEGG motor

Motor type SM200.20C-20 - gearless

	Nameplate data	(Operating
data)		
Rated voltage	V 360	
Rated frequency	Hz 32	(31,8)
Rated torque	Nm 330	(321,2)
Rated speed	rpm 192	(191,0)
Rated output power	kW 6,6	(6,4)
Rated current	A 19	(18,5)
Maximum torque	Nm 570	(570)
Current at maximum torque	A 41,5	(41,5)
Inertia of motor	kgm ² 0,160	
Possible acceleration	m/s ² 1,10	

(MKmax=280,0 Nm)

Without cooling (97)
Dimension sheet A-M-6716, Motor construction type IMB3
Motor with encoder ECN 1313-2048Endat

Selected frequency inverter

Inverter ZAdyn 4CS023, Rated inverter current 23 A
mains current 13,5 A, 400 V, 8,9 kW, Max. 1,10 m/s²
Radio interference filter, integrated ; Line reactor, integrated
Brake resistance separate BR25-3 (or Recuperation: ZAreC4C 013)